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UNITED STATES PATENT APPLICATION FOR

**REMOTE CONTROL VALVE FOR URINE COLLECTION BAG**

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## **BACKGROUND OF THE INVENTION**

### **1. FIELD OF THE INVENTION**

[0001] This invention relates generally to the collection of bodily waste. More particularly, the invention relates to urine collection bags worn by persons who are incontinent.

### **2. BACKGROUND**

[0002] Incontinence afflicts many persons, especially many who are confined to wheelchairs. Typically, such persons have a urine collection bag that is worn on the leg, commonly at or near the calf. Conventional collection bags have a drain tube to permit emptying of the contents. For many incontinent persons, particularly paraplegic and quadriplegic individuals, considerable effort is required to empty a collection bag. Often, the assistance of an attendant is required.

[0003] Because the difficulties associated with emptying conventional collection bags may reduce a person's independence and may also cause embarrassment, efforts have been made to provide incontinent persons, particularly those confined to wheelchairs, with a means for more conveniently draining a collection bag. For example, U.S. Patent No. 3,931,650 discloses a disposal device for wheelchairs in which the collection bag drain tube is connected to a valve mounted on the wheelchair. The valve may be manually operated, as by a lever within reach of the wheelchair occupant, or may be electrically operated using a solenoid. The valve and control mechanism, being mounted to the wheelchair, is inherently conspicuous.

## **SUMMARY OF THE INVENTION**

**[0004]** The present invention provides a discreet apparatus for draining a urine collection bag worn by an incontinent person, particularly such a person who is confined to a wheelchair. An electrically operated drain valve is coupled to a drain tube of the urine collection bag. A control device for remotely controlling the drain valve is adapted to be worn by the person. The control device is preferably disguised with an outward configuration resembling an article that is ordinarily carried or worn for other purposes, thereby concealing the true function of the device. Examples of such articles include a personal electronic device, such as a pager, cell phone or the like, a key fob, a belt buckle, a pen, a broach, a decorative pin, etc.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

**[0005]**        **Figure 1** illustrates the general configuration of a remote control valve in accordance with the present invention.

**[0006]**        **Figure 2** is a detailed view of the control device in **Figure 1**.

**[0007]**        **Figures 3A-3D** illustrate alternative control device configurations.

## **DETAILED DESCRIPTION OF THE INVENTION**

**[0008]** In the following description, for purposes of explanation and not limitation, specific details are set forth in order to provide a thorough understanding of the present invention.

However, it will be apparent to one skilled in the art that the present invention may be practiced in other embodiments that depart from these specific details. In other instances, detailed descriptions of well-known methods and devices are omitted so as to not obscure the description of the present invention with unnecessary detail.

**[0009]** **Figure 1** generally illustrates the present invention as it may be employed by a person **10** confined to a wheelchair **12**. A urine collection bag **14**, commonly called a “legbag”, is worn on the person’s leg and is secured by strap **16**. A catheter or other collection device drains into bag **14** through tube **18**. Bag **14** drains through tube **20**, which is connected to valve **22**. A fine mesh filter may be incorporated within tube **20** or valve **22** to capture any stray materials.

**[0010]** Valve **22** is conveniently worn about the ankle and may be secured by an adjustable strap **24**. Valve **22** is preferably enclosed within a soft padded case to prevent irritation of the person’s skin. Strap **24** is also preferably made of a soft pliable material and may employ a hook and loop or other type of conventional closure device. An outlet tube **26** extends downwardly from valve **22** to a point just below the sole of the person’s shoe.

**[0011]** Valve **22** is actuated by means of a low voltage solenoid. An electrical signal to operate the solenoid is sent from control device **28** through electrical cable **30**. Cable **30** is preferably a flexible flat wire cable, which is able to withstand the daily abuse of being worn and protects the skin of the wearer by not leaving a “wire mark” on the skin, particularly near the waistband where cable **30** connects to control device **28**. As will be explained more fully below, control device **28** may be disguised as a pager or similar personal electronic device that is commonly worn on a person’s belt or waistband. Cable **30** preferably connects to device **28** at the rear thereof and is threaded over the belt or waistband to be routed through the pants leg to valve **22**.

It should be noted that the wheelchair-bound person would typically wear full-length pants, thereby concealing collection bag **14** and valve **22**. Only outlet tube **26** would be visible below the pant cuff.

**[0012]** Valve **22** is preferably operated by a low voltage solenoid so that a suitable power source can be readily carried within control device **28** or within the enclosure for valve **22**. The power source may comprise a disposable or rechargeable battery. For example, a 3.6 volt NiMH rechargeable battery may be used. Recharging may be accomplished with a conventional external charger or by means of a solar cell on device **28**.

**[0013]** The fluid conducting portions of valve **22** are preferably constructed of materials that will not be corroded or otherwise degraded when conducting caustic fluids. Furthermore, the valve mechanism should be configured so that its sealing capability is not compromised by crystallization of the conducted fluid. The actuating solenoid should, of course, be compatible with the power source. The solenoid should also have a low holding current to maximize battery life. Assuming collection bag **14** has a capacity of 32 ounces and is elevated about one foot above valve **22**, the valve is exposed to approximately 8.5 pounds of pressure. Thus, a relatively low force valve closure spring may be employed, thereby reducing the power required for actuation of the valve.

**[0014]** **Figure 2** is a detailed view of control device **28**. As mentioned, the control device may be disguised as an article that a person might carry or wear for other purposes, such as a pager, cell phone or similar personal electronic device. Thus, the device may have a simulated display window **32**. If a solar cell is used to maintain the charge of the power supply battery, the cell may be disposed within window **32**. The device is secured to a belt or waistband with a clip **34** or other suitable means. Device **28**, including clip **34**, should be free of any sharp edges that might cause skin irritation or other discomfort.

**[0015]** Control device **28** includes a valve actuation control, such as a push button **36**. A determined effort should be required to operate control **36** so that valve **22** is not inadvertently

actuated, but the effort should not be so great as to be difficult for persons with limited manual strength or dexterity.

**[0016]** When it becomes necessary to empty to contents of collection bag **14**, wheelchair **12** is maneuvered so that outlet tube **26** is positioned over a floor drain other suitable receptacle. Control **36** is then depressed to energize the solenoid for actuating valve **22**. The dimensions of the fluid conducting path through valve **22** are preferably large enough to allow the contents of the collection bag, up to about 32 ounces, to completely drain within a reasonable period of time, such as 60 seconds or less.

**[0017]** In the foregoing description, control device **28** communicates with valve **22** via a wired connection **30**. It will be appreciated that a wireless connection may also be employed using a radio frequency (RF) signal or other suitable means. In such case, control device **28** incorporates a small wireless transmitter and valve **22** incorporates a cooperating wireless receiver. Suitable transmitters and receivers for operating over short distances are well known. For example, a transmitter and receiver using the "Bluetooth" protocol may be employed. A wireless control device may be configured to resemble any of a variety of articles that are commonly carried or worn. For example, in addition to a personal electronic device as described above, the control device could be configured to resemble a key fob, belt buckle, pen, broach or decorative pin as shown in **Figures 3A-3D**, respectively.

**[0018]** It will be recognized that the above-described invention may be embodied in other specific forms without departing from the spirit or essential characteristics of the disclosure. Thus, it is understood that the invention is not to be limited by the foregoing illustrative details, but rather is to be defined by the appended claims.